PROJECT NUMBER: 2501
PROJECT TITLE: Smoke Chemistry
PROJECT LEADER: R. Comes
PERIOD COVERED: June, 1989

I. SIDESTREAM SMOKE

A. **Objective**: Conduct studies on sidestream smoke including: development of methods for collection and analysis of sidestream gas phase and semivolatiles; visibility determinations; analysis of selected materials relating to sidestream odor and irritation; development of proprietary products.

B. **Status**: 1.) Evaluation of the six models in the analytical-subjective study continues by several methods. Multiple smoke runs have been carried out to independently collect, analyze and compare the SS gas phase and SS semivolatile fractions from these models. The semivolatile analysis by capillary gc-NPD/FID on the samples from silica gel fractionation is nearing completion. Additional runs using the Tekmar desorber for gas phase collection and analysis are in progress. 2.) The mixture of sulfur gases for calibration of the Sievers sulfur detector has been received. The setup of the detector is in progress and will continue as time permits. Development of procedures for analysis of sulfur compounds in MS and SS smoke will then be carried out. 3.) Testing of the first 8-port visibility apparatus continues in conjunction with personnel from U.S. Testing. The second 8-port system is nearing completion incorporating some design modifications to facilitate future planned operation in a QA environment. Assistance in this redesign/construction is currently being supplied on an as needed basis. A patent application is being written. 4.) Smoke distribution data has been obtained on two models (control and $Mg(OH)_2$ wrapped) from the analytical/subjective study using ^{14}C-labelled sugars as the ^{14}C-source. A 50/50 mixture of (U)^{14}C-glucose/fructose was spray applied to filler pulled from the appropriate models. This labelled filler was then remade into cigarettes using the same paper tubes. The smoke distribution study to compare the control with the small particle size $CaCO_3$ wrapped cigarette is about to begin.

II. SIDESTREAM SMOKING CHAMBER

A. **Objective**: Design and construct an environmentally controllable chamber to measure selected components of sidestream smoke.

B. **Status**: The major project effort during this reporting period has been on the chamber construction. Assistance has been required and generously supplied from several areas external the Chemical Research Division. Many modifications have been made to the HVAC equipment, to computer hardware and software necessary for chamber operation and data collection, to instrumentation for on-line data collection and to the laboratory itself. Preliminary smoking runs

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have been made to study smoking machine operation and to investigate all parameters currently operational. Chamber smoke runs for "hard data" generation will commence shortly.

III. MISCELLANEOUS

Limited gc/ms and pyrolysis/gc/ms support was supplied as requested. Due to the priority of the Sidestream Smoke Chamber, a reassignment of personnel has been required. This has necessitated the temporary cessation of the gc/ms capability.

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